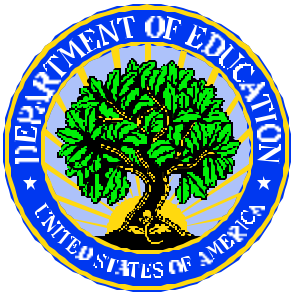
The Status of Year 2000 Readiness in the Nation's Postsecondary Institutions

Fall 1999

United States Department of Education



November 8, 1999

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Fall 1999

Prepared by:
Allison Henderson
Westat
Rockville, Maryland

Prepared for:
Office of the Chief Information Officer
U.S. Department of Education

Prepared Under:
Contract Number EA94052001
Office of the Under Secretary
Planning and Evaluation Service
U.S. Department of Education

November 8, 1999

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Executive Summary

As the new millennium approaches, the nation has grown increasingly concerned about the Year 2000 (commonly referred to as Y2K) Problem or "Millennium Bug." The Y2K Problem not only affects our personal and business computers, it may affect other systems that use embedded software and technologies such as heating systems, elevators, and telecommunications. Systems that have not been brought into Y2K compliance may crash, with widespread system failure, or they may experience minor bugs.

In September 1999, the U.S. Department of Education (ED) contracted with Westat to conduct a telephone survey on the Y2K readiness of our nation's postsecondary institutions. The survey was a followup to an ED-sponsored Y2K readiness survey conducted in summer 1999. The followup survey addressed two major sectors: a random sample of non-minority-serving postsecondary institutions and the universe of minority-serving institutions. Tables A and B provide a snapshot of the overall survey findings.

Key Findings

- In fall of 1999—less than 3 months before the new millennium—61 percent of non-minority-serving postsecondary institutions reported that their mission-critical systems were 100 percent Y2K compliant. Minority-serving institutions lagged behind non-minority-serving institutions, with 44 percent reporting that they were 100 percent compliant.

- Almost three-quarters (73%) of postsecondary institutions have developed contingency plans for their mission-critical and other related business systems. Eighty-eight percent of institutions estimated that they would have these plans in place by the end of the year. Sixty-eight percent of minority-serving institutions reported that they had developed contingency plans.

- By the fall of 1999, 85 percent of non-minority-serving institutions had taken action to ensure that all hardware, software, and embedded technologies had been Y2K-renovated and tested—only 1 percentage point less than those reporting that their mission-critical systems were 100 percent compliant in the summer. Eighty-four percent of minority-serving institutions reported such testing by fall, compared to 81 percent reported in the summer survey.

- Forty-four percent of non-minority-serving and 42 percent of minority-serving institutions reported that they had tested electronic exchange systems with their major trading partners. Slightly over one-half of institutions reported testing exchange systems with their major trading partners in the fall survey.

- Overall, institutions had made more progress in completing Y2K repairs on their central administration (67%) and student services (70%) than they had on their infrastructure (62%). Minority-serving institutions lagged behind non-minority institutions on bringing all three types of key systems into compliance.

TABLE A
YEAR 2000 SURVEY OF POSTSECONDARY INSTITUTIONS

	Summer Survey	Fall Survey	Progress
Status of **Mission-Critical Systems**			
All Mission-Critical Systems Currently Y2K Compliant	30%	61%	31
Mission-Critical Systems Y2K Compliant By October 1	60%	63%	3
Mission-Critical Systems Y2K Compliant By November 1	80%	79%	***-1***
Mission-Critical Systems Y2K Compliant By December 1	90%	90%	0
Mission-Critical Systems Y2K Compliant By January 1	99%	97%	***-2***
Action Taken To Ensure **Hardware, Software, and Embedded Technologies** Are Y2K Compliant			
	86%	85%	***-1***
Y2K Testing (Will Be) Has Been Conducted w/**Trading Partners**			
	(66%)	44%	---
Status of **Contingency Plans** for Mission-Critical Systems			
Contingency Plans Have Been Completed	63%	73%	***10***
Contingency Plans Completed by October 1 (All Systems)	83%	73%	***-10***
Contingency Plans Completed by November 1 (All Systems)	93%	78%	***-15***
Contingency Plans Completed by December 1 (All Systems)	96%	84%	***-12***
Contingency Plans Completed by January 1 (All Systems)	99%	88%	***-11***

	Fall Survey
Status of **Central Administrative Systems** (e.g., accounting, finance, payroll, etc.)	
All Central Administrative Systems Currently Y2K Compliant	67%
Central Administrative Systems Y2K Compliant By October 1	68%
Central Administrative Systems Y2K Compliant By November 1	80%
Central Administrative Systems Y2K Compliant By December 1	90%
Central Administrative Systems Y2K Compliant By January 1	95%
Status of **Student Services** (e.g., student records, student aid, food services, etc.)	
All Student Services Currently Y2K Compliant	70%
Student Services Y2K Compliant By October 1	71%
Student Services Y2K Compliant By November 1	81%
Student Services Y2K Compliant By December 1	91%
Student Services Y2K Compliant By January 1	96%
Status of **Infrastructure** (e.g., heating/AC, building, security, telecommunications, etc.)	
All Infrastructure Components Currently Y2K Compliant	62%
Infrastructure Components Y2K Compliant By October 1	63%
Infrastructure Components Y2K Compliant By November 1	72%
Infrastructure Components Y2K Compliant By December 1	79%
Infrastructure Components Y2K Compliant By January 1	85%

Excludes minority-serving and foreign institutions.

TABLE B
YEAR 2000 SURVEY OF
MINORITY-SERVING POSTSECONDARY INSTITUTIONS

	Summer Survey	Fall Survey	Progress
Status of **Mission-Critical Systems**			
All Mission-Critical Systems Currently Y2K Compliant	24%	44%	20
Mission-Critical Systems Y2K Compliant By October 1	53%	49%	***-4***
Mission-Critical Systems Y2K Compliant By November 1	69%	69%	0
Mission-Critical Systems Y2K Compliant By December 1	86%	88%	2
Mission-Critical Systems Y2K Compliant By January 1	98%	98%	0
Action Taken To Ensure **Hardware, Software, and Embedded Technologies** Are Y2K Compliant			
	81%	84%	3
Y2K Testing (Will Be) Has Been Conducted w/**Trading Partners**			
	(80%)	42%	---
Status of **Contingency Plans** for Mission-Critical Systems			
Contingency Plans Have Been Completed	61%	68%	7
Contingency Plans Completed by October 1 (All Systems)	85%	68%	***-17***
Contingency Plans Completed by November 1 (All Systems)	92%	76%	***-16***
Contingency Plans Completed by December 1 (All Systems)	97%	85%	***-12***
Contingency Plans Completed by January 1 (All Systems)	97%	89%	***-8***

	Fall Survey
Status of **Central Administrative Systems** (e.g., accounting, finance, payroll, etc.)	
All Central Administrative Systems Currently Y2K Compliant	60%
Central Administrative Systems Y2K Compliant By October 1	61%
Central Administrative Systems Y2K Compliant By November 1	70%
Central Administrative Systems Y2K Compliant By December 1	88%
Central Administrative Systems Y2K Compliant By January 1	96%
Status of **Student Services** (e.g., student records, student aid, food services, etc.)	
All Student Services Currently Y2K Compliant	60%
Student Services Y2K Compliant By October 1	63%
Student Services Y2K Compliant By November 1	74%
Student Services Y2K Compliant By December 1	88%
Student Services Y2K Compliant By January 1	94%
Status of **Infrastructure** (e.g., heating/AC, building, security, telecommunications, etc.)	
All Infrastructure Components Currently Y2K Compliant	46%
Infrastructure Components Y2K Compliant By October 1	50%
Infrastructure Components Y2K Compliant By November 1	61%
Infrastructure Components Y2K Compliant By December 1	78%
Infrastructure Components Y2K Compliant By January 1	88%

Excludes foreign institutions.

Introduction

As the new millennium approaches, the nation has grown increasingly concerned about the Year 2000 (commonly referred to as Y2K) Problem or "Millennium Bug." The problem stems from early decisions made by computer programmers to code only the last two digits of a year (for example, 99 instead of 1999) to save storage space. On January 1, 2000, older computers that have not been repaired to read 4-digit dates will read the New Year as 1900.

The Y2K Problem not only affects our personal and business computers, it may affect other systems that use embedded software and technologies such as heating systems, elevators, and telecommunications. Systems that have not been brought into Y2K compliance may crash, with widespread system failure, or they may experience minor bugs.

The extent of the Y2K Problem will not be known until the New Year. However, many businesses and public agencies have made Y2K compliance a major priority to ensure a smooth transition into 2000 by allocating the necessary human and financial resources to repair and test their technologies.

In September 1999, the U.S. Department of Education (ED) contracted with Westat to conduct a telephone survey on the Y2K readiness of our nation's postsecondary institutions. The purpose of the survey was to determine the degree of Y2K preparedness of postsecondary institutions and to identify areas in need of assistance. Throughout this report, the survey is referred to as the "fall survey."

Westat sampled 1,600 non-minority-serving institutions in the U.S., Puerto Rico, and the Virgin Islands. Westat researchers conducted the survey from September 13 through October 11, 1999, and achieved an 84 percent response rate for the survey. Appendix A presents the methodology and sampling frames used to conduct the survey.

In addition, Westat surveyed the universe of 339 minority-serving postsecondary institutions that included 123 Historically Black Colleges and Universities (HBCU)[1], 188 Hispanic-serving institutions (HSI), and 30 Tribal institutions. The survey was conducted from September 8 through October 15, 1999, and closed with a 90 percent response rate for HBCUs, 88 percent for HSIs, and 94 percent for Tribal institutions. Definitions for classifying institutions as HBCU, HSI, or Tribal are provided in the glossary (Appendix D).

The fall survey was a followup to an ED-sponsored Internet-based survey. The baseline survey was posted on the Internet, and the contractor mailed letters to over 5,800 postsecondary institutions asking them to complete the questionnaire. Researchers achieved a 32 percent response rate during the survey period that ran from May 17 through July 2, 1999. We refer to the baseline survey as the "summer survey" in this report. [2]

As the researchers of the original survey noted, the voluntary nature of the web-based survey produced a certain degree of response bias. Larger and public postsecondary institutions were more likely than small or proprietary institutions to respond to the survey; therefore, the results were skewed to reflect the characteristics of the large public institutions. Because of this bias in the results, we have presented limited comparative information between the summer and fall surveys.

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[1] There are 105 Historically Black Colleges and Universities. However, several institutions reported multiple campuses (including graduate programs) bringing the total number surveyed to 123.

[2] See U.S. Department of Education (1999). *Year 2000 Survey of Postsecondary Educational Institutions*. Washington, DC: Author.

The fall survey asked technology coordinators about their institution's Y2K compliance in five major areas:

- The status of mission-critical systems;
- The status of contingency plans for mission-critical systems;
- The renovation and testing of hardware, software, and embedded technologies;
- The status of testing with major trading partners; and
- The status of other key technology systems, including those for the central administration, student services, and infrastructure.

This report presents the overall findings for each of the topic areas. Analyses are also provided by institutional size based on student enrollment and type (4-year public, 4-year private, 2-year public and private, and proprietary). Separate results are provided for the three types of minority-serving institutions. Information about the methodology used to conduct the fall survey is provided in Appendix A. Appendix B presents supporting data for selected statistics, including the standard errors and estimate ranges. A copy of the survey instrument can be found in Appendix C. A glossary of terms is provided in Appendix D.

Status of Mission-Critical Systems

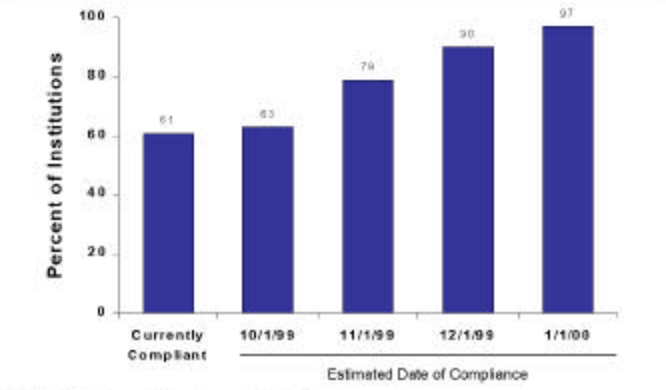
Mission-critical systems are those information systems that are regarded by postsecondary institutions as essential to a core business activity or process. Failure of these systems would most likely result in the greatest damage to technology capabilities and should receive the highest priority in compliance planning and action. In fall of 1999C less than 3 months before the new millenniumC**61 percent of non-minority-serving postsecondary institutions reported that their mission-critical systems were 100 percent Y2K compliant.** This translates into approximately 2,000 institutions and 5.7 million students. (Figure 1 and Table 1)

Small institutions reported higher rates of compliance (65%) than their mid-size (54%) and larger (57%) counterparts.[3] Proprietary institutions were more likely to have reached 100 percent compliance (67%) than 4-year public (61%), 4-year private (58%), or 2-year public and private (58%) institutions. (Tables 2 and 3)

Minority-serving institutions lagged behind non-minority-serving institutions in their Y2K readiness. Overall, 44 percent of minority-serving institutions reported that they were 100 percent compliant, compared to 61 percent of non-minority-serving institutions. Tribal institutions reported a higher rate of compliance (52%) than HSIs (47%) and HBCUs (39%). (Figure 2 and Table 4)

The good news is that 97 percent of institutions overall estimated that they would be 100 percent compliant by January 1, 2000. If institutions meet this goal, the number of non-compliant institutions will drop to 108, enrolling approximately 244,000 students. Institutions have made progress since the summer survey when only 30 percent indicated that they were 100 percent Y2K compliant. In the summer, 60 percent of Y2K coordinators believed that their institutions would be compliant by October 1; the fall survey indicated that 63 percent will reach this goal. However, progress will be slower in mid-size and larger institutions. Likewise, proprietary institutions are advancing at a faster pace than other institutional types. Less than one-half of coordinators in minority-serving institutions estimated that they would be compliant by October 1, yet 98 percent estimated that they would be compliant by the New Year. (Tables 2 and 3).

Figure 1
Status of Mission-Critical Systems in Postsecondary Institutions



Excludes foreign and minority-serving institutions.
Y2K Postsecondary Institution Survey, Fall 1999

[3] For this report, we have used the following enrollment classifications to define institutional size: small-less than 1,000 students enrolled, medium-1,000 to 4,999 students enrolled, and large-5,000 students enrolled or greater.

Table 1
Status of Y2K Compliance of **Mission-Critical Systems** in Postsecondary Institutions: Summer and Fall 1999

Status	Summer	Fall	Change
Percent currently Y2K compliant	30%	61%	30
Percent Y2K compliant by:			
October 1	60%	63%	3
November 1	80%	79%	-1
December 1	90%	90%	0
January 1	99%	97%	-2

Excludes minority-serving and foreign institutions.

Table 2
Status of Y2K Compliance of **Mission-Critical Systems** in Postsecondary Institutions: By Size of Enrollment, Fall 1999

	Enrollment		
Status	<1,000	1,000-4,999	≥5,000
Percent of institutions currently Y2K compliant	65%	54%	57%
Percent Y2K compliant by:			
October 1	66%	55%	60%
November 1	83%	70%	78%
December 1	91%	88%	90%
January 1	97%	97%	98%

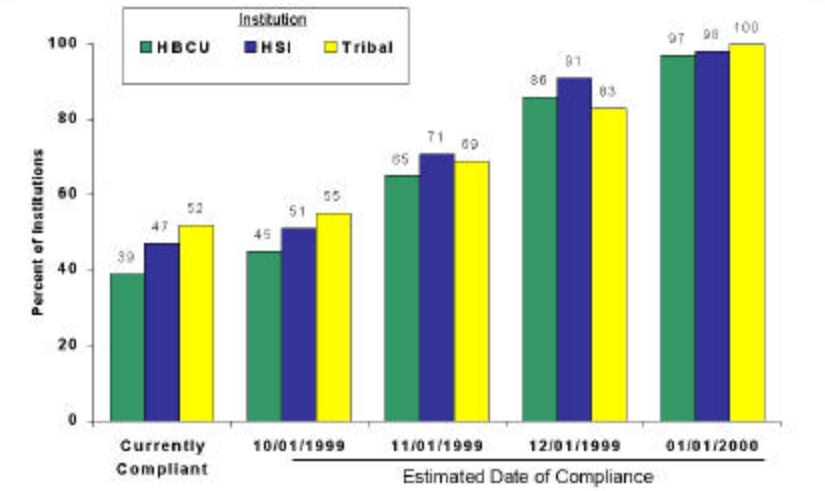
Excludes minority-serving and foreign institutions.

Table 3
Status of Y2K Compliance of **Mission-Critical Systems** in Postsecondary Institutions: By Institutional Type, Fall 1999

	Type			
Status	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent of institutions currently Y2K compliant	61%	58%	58%	67%
Percent Y2K compliant by:				
October 1	63%	60%	59%	68%
November 1	80%	78%	76%	82%
December 1	92%	90%	89%	90%
January 1	100%	97%	97%	98%

Excludes minority-serving and foreign institutions.

Figure 2
Status of Mission-Critical Systems in Minority-Serving Institutions



Excludes foreign institutions.
Y2K Postsecondary Institution Survey, Fall 1999

Table 4
Status of Y2K Compliance of **Mission-Critical Systems** in Minority-Serving Postsecondary Institutions: Fall 1999

	Minority-Serving Institution			
Status	Overall	HBCU	HSI	Tribal
Percent of institutions currently Y2K compliant	44%	39%	47%	52%
Percent Y2K compliant by:				
October 1	49%	45%	51%	55%
November 1	69%	65%	71%	69%
December 1	88%	86%	91%	83%
January 1	98%	97%	98%	100%

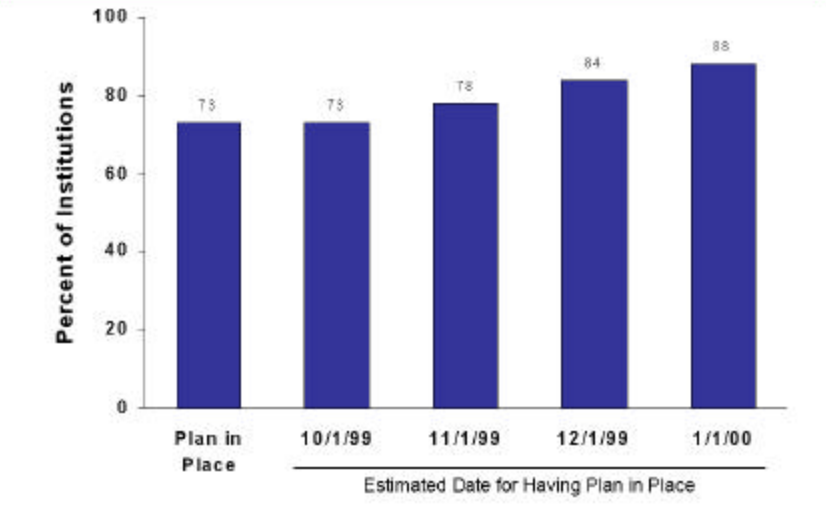
Excludes foreign institutions.

Status of Y2K Contingency Planning

In addition to renovating their technologies for Y2K compliance, postsecondary institutions should have a well-documented plan of action for unforeseen Y2K-related failures of their mission-critical systems. The plan should identify the steps the institution would take in order to ensure continuity of operations should they experience the loss of a system, function, or process due to Y2K failure. **Almost three-quarters (73%) of postsecondary institutions have developed contingency plans for their mission-critical business and related systems**. Eighty-eight percent of postsecondary institutions estimated that they would have these plans in place by the end of the year. (Figure 3 and Table 5)

As with renovating their mission-critical systems, large institutions fell behind small and medium institutions in developing contingency plans. Sixty-nine percent of large institutions reported that they had plans in place, compared to 76 percent of small and 70 percent of mid-size institutions by October 1st. Proprietary institutions were ahead of all other institutional types in terms of contingency planning. Sixty-eight percent of minority-serving institutions had completed contingency plans. HSIs were more likely to have completed plans (74%) than Tribal institutions (69%) and HBCUs (59%). (Figure 4; Tables 6 through 8)

Figure 3
Status of Y2K Contingency Planning in Postsecondary Institutions for Mission-Critical and Related Systems



Excludes foreign and minority-serving institutions.
Y2K Postsecondary Institution Survey, Fall 1999

Table 5
Status of Y2K **Contingency Plans** for **Mission-Critical and Related Systems** in Postsecondary Institutions: Summer and Fall 1999

Status	Summer	Fall	Change
Percent currently with plans	63%	73%	10
Percent with plans by:			
October 1	83%	73%	-10
November 1	93%	78%	-15
December 1	96%	84%	-12
January 1	99%	88%	-11

Excludes minority-serving and foreign institutions.

Table 6
Status of Y2K **Contingency Plans** for **Mission-Critical and Related Systems** in Postsecondary Institutions: by Size of Enrollment, Fall 1999

	Enrollment		
Status	<1,000	1,000-4,999	≥5,000
Percent currently with plans	75%	70%	68%
Percent with plans by:			
October 1	76%	70%	69%
November 1	79%	75%	78%
December 1	85%	80%	85%
January 1	89%	86%	89%

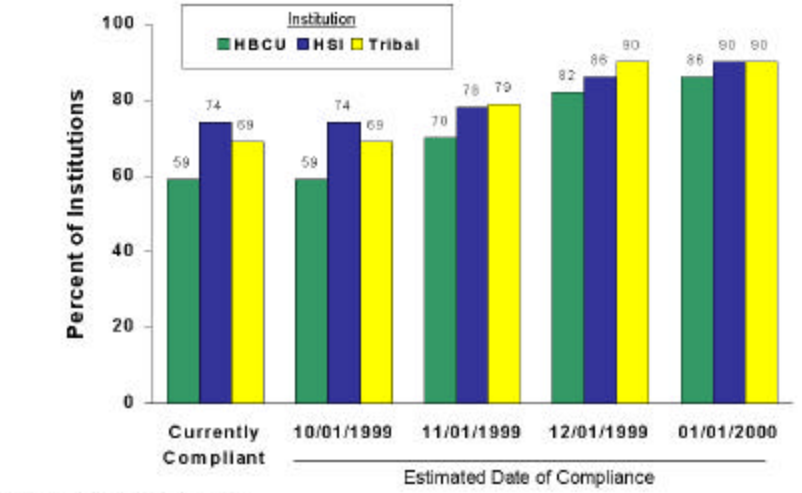
Excludes minority-serving and foreign institutions.

Table 7
Status of Y2K **Contingency Plans** for **Mission-Critical and Related Systems** in Postsecondary Institutions: by Institutional Type, Fall 1999

	Type			
Status	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent currently with plans	74%	67%	70%	80%
Percent with plans by:	75%	67%	71%	80%
November 1	84%	74%	75%	81%
December 1	89%	80%	81%	87%
January 1	92%	85%	86%	91%

Excludes minority-serving and foreign institutions.

Figure 4
Status of Y2K Contingency Planning in Minority-Serving Institutions



Excludes foreign institutions.

Y2K Postsecondary Institution Survey, Fall 1999

Table 8
Status of Y2K **Contingency Plans** for **Mission-Critical Systems** in Minority-Serving Postsecondary Institutions: Fall 1999

	Minority-Serving Institution			
Status	Overall	HBCU	HSI	Tribal
Percent currently with plans	68%	59%	74%	69%
Percent with plans by:	68%	59%	74%	69%
November 1	76%	70%	78%	79%
December 1	85%	82%	86%	90%
January 1	89%	86%	90%	90%

Excludes foreign institutions.

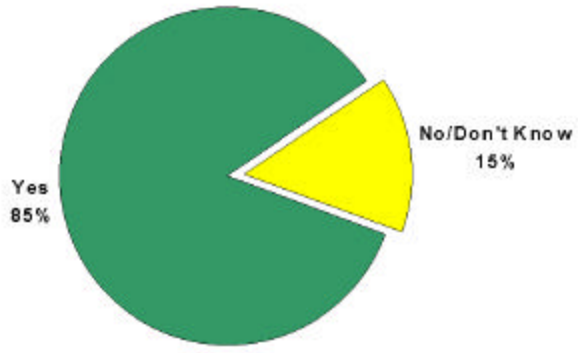
Status of Hardware, Software, and Embedded Technologies

We are living in an age where technology touches nearly everything in our daily lives. The Y2K Problem potentially may extend well beyond our computers to the hardware, software, and embedded technologies[4] that operate our most basic machines and equipment. Failure of embedded technologies may cause serious disruptions to learning. For example, a loss of telecommunications, heating and cooling systems, elevators, or security systems (sprinklers and alarms) could cause institutions to close until they are repaired.

The majority of institutions appear to be bringing these systems into Y2K compliance, but progress has stalled since the summer. **By the fall of 1999, 85 percent of non-minority-serving institutions had taken action to ensure that all hardware, software, and embedded technologies had been Y2K-renovated and testedConly 1 percentage point less than what was reported in the summer**. The rates of institutional action taken to address these technologies varied little across institutional size or type. (Figure 5; Tables 9 through 11)

The rate of renovating and testing hardware, software, and embedded technologies was comparable between minority and non-minority-serving institutions**C**84 percent and 85 percent, respectively. There were, however, considerable differences within minority-serving institutions. Ninety percent of Tribal institutions had tested these technologies, compared to 77 percent of HBCUs and 74 percent of HSIs. (Table 12)

Figure 5
Action Taken To Ensure Hardware, Software, and Embedded Technologies Are Y2K Compliant



Excludes foreign and minority-serving institutions.
Y2K Postsecondary Institution Survey, Fall 1999

[4] Embedded technologies are devices such as microprocessors or microcontrollers used to operate or monitor equipment and machinery.

Table 9
Status of Postsecondary Institution Action Taken To Ensure all **Hardware, Software, and Embedded Technologies** Have Been Y2K-Renovated, Tested, and Implemented: Summer and Fall 1999

Status	Summer	Fall	Change
Percent that have taken action	86%	85%	-1
Percent that will take action by:			
October 1	--	85%	--
November 1	--	90%	--
December 1	--	94%	--
January 1	--	97%	--

Excludes minority-serving and foreign institutions.

Table 10
Status of Postsecondary Institution Action Taken To Ensure all **Hardware, Software, and Embedded Technologies** Have Been Y2K-Renovated, Tested, and Implemented: by Size of Enrollment, Fall 1999

	Enrollment		
Status	<1,000	1,000-4,999	≥5,000
Percent that have taken action	84%	86%	84%
Percent that will take action by:			
October 1	84%	87%	85%
November 1	89%	91%	90%
December 1	93%	96%	95%
January 1	97%	98%	97%

Excludes minority-serving and foreign institutions.

Table 11
Status of Postsecondary Institution Action Taken To Ensure all **Hardware, Software, and Embedded Technologies** Have Been Y2K-Renovated, Tested, and Implemented: by Institutional Type, Fall 1999

	Type			
Status	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent that have taken action	86%	85%	82%	87%
Percent that will take action by:				
October 1	87%	85%	83%	87%
November 1	92%	90%	87%	91%
December 1	95%	96%	93%	93%
January 1	98%	98%	96%	97%

Excludes minority-serving and foreign institutions.

Table 12
Status of Action Taken To Ensure all **Hardware, Software, and Embedded Technologies** Have Been Y2K-Renovated, Tested, and Implemented in Minority-Serving Postsecondary Institutions: Fall 1999

	Minority-Serving Institution			
Status	Overall	HBCU	HSI	Tribal
Percent that have taken action	84%	77%	74%	90%
Percent that will take action by:				
October 1	84%	77%	74%	90%
November 1	88%	81%	78%	90%
December 1	96%	95%	86%	93%
January 1	98%	97%	90%	100%

Excludes foreign institutions.

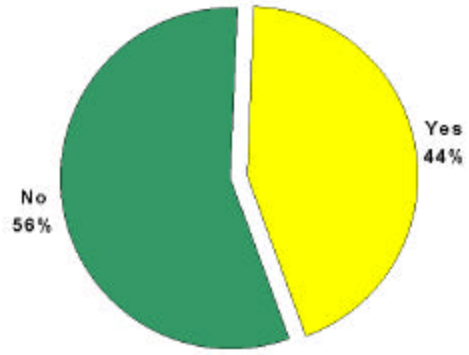
Status of Y2K Testing with Trading Partners

Most postsecondary institutions conduct at least some business electronically. Payroll, for example, is usually handled electronically between the institution and a bank, or many banks if it offers direct deposit services. Institutions may also exchange information with each other and with high schools to obtain transcripts. Postsecondary institutions that participate in federal student financial aid transmit information to, and receive information from, the U.S. Department of Education. The entities that institutions exchange information with are called trading partners.

All institutions should test their electronic data exchange operations with major trading partners well before January 1. **Forty-four percent of institutions reported testing exchange systems with their major trading partners in the fall survey.** The rates remained low by institutional size (ranging from 40% for mid-size to 47% for large institutions). Four-year public institutions were more likely to have tested their exchange systems (54%) than 4-year private (38%), 2-year public and private (42%) and proprietary (49%) institutions. (Table 13 and Figure 6)

Overall, 42 percent of minority-serving institutions had tested their trading mechanisms. Tribal institutions were least likely to have conducted any testing (38%), followed by HBCUs (40%) and HSIs (45%). (Table 13)

Figure 6
Action Taken to Test with Major Trading Partners



Excludes foreign and minority-serving institutions.
Y2K Postsecondary Institution Survey, Fall 1999

Table 13
Percent of Postsecondary Institutions That Have Conducted Y2K Testing with Major Trading Partners: by Institutional Characteristic, Fall 1999

Characteristic	Percent of Institutions That Have Tested Trading Systems
Total [1/]	44%
Enrollment [1/]	
< 1,000	46%
1,000 to 4,999	40%
≥5,000	47%
Type [1/]	
4-year public	54%
4-year private	38%
2-year public and private	42%
Proprietary	49%
Minority-Serving Institutions [2/]	
HBCU	40%
HSI	45%
Tribal	38%
Overall	42%

[1/] Excludes minority-serving and foreign institutions.
[2/] Excludes foreign institutions.

Status of Y2K Compliance of Key Operational Systems

Technology coordinators were asked about the status of three key operational systems:

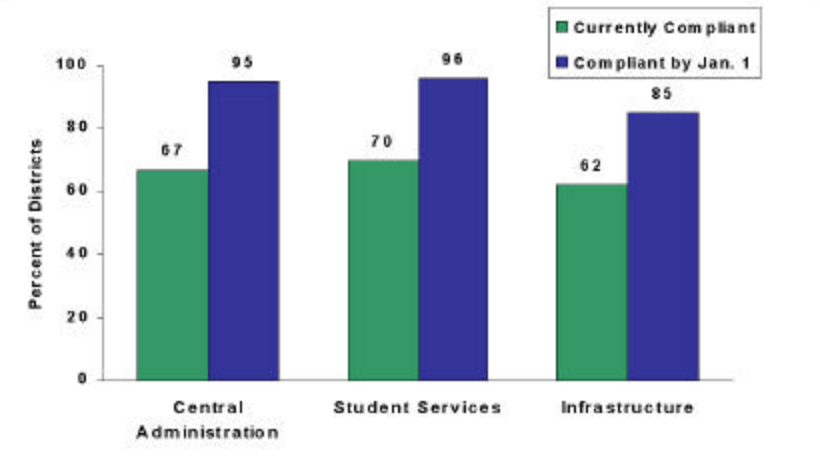
- Central administration systems, such as accounting, finance, and payroll;
- Student services, such as student records, student aid, and food services; and
- Infrastructure systems, such as heating and cooling systems, fire alarm/sprinkler systems, food services/refrigeration services, building security systems, and telecommunications.

Overall, institutions had made more progress in completing Y2K repairs on their central administration (67%) and student services (70%) than they had on their infrastructure (62%). While at least 95 percent of institutions estimated that they would complete work on their administration and student services systems, only 85 percent estimated that they would be able to complete the infrastructural renovations. In general, small and proprietary institutions had made more progress in completing work on each of the three systems than had other institutions. (Figure 7; Tables 14 through 21)

Minority-serving institutions lagged behind non-minority institutions on bringing all three types of key systems into compliance. Minority-serving institutions particularly were at a disadvantage in terms of their infrastructure systems. Less than one-half (46%) for infrastructure had brought these systems into compliance, and the rates by institution type ranged from 59 percent for Tribal institutions to 40 percent for HBCUs. (Tables 16, 19 and 22)

Nearly all institutions plan to bring their central administrative and student services into compliance before January 1. In most cases, less than 90 percent of institutions plan to renovate their infrastructure systems by then. The exceptions are large institutions (92% plan to be compliant by January 1) and 4-year public institutions (94%).

Figure 7
Y2K Status of Key Operational Systems



Excludes foreign and minority-serving institutions.
Y2K Postsecondary Institution Survey, Fall 1999

Table 14
Status of Y2K Compliance for **Central Administration Systems** in Postsecondary Institutions Overall and by Enrollment: Fall 1999

Status	Enrollment			
	All Institutions	<1,000	1,000-4,999	≥5,000
Percent of institutions 100% compliant	67%	68%	65%	66%
Percent compliant by:				
October 1	68%	69%	66%	67%
November 1	80%	81%	78%	79%
December 1	90%	91%	89%	89%
January 1	95%	95%	95%	97%

Excludes minority-serving and foreign institutions.

Table 15
Status of Y2K Compliance for **Central Administration Systems** in Postsecondary Institutions: By Institutional Type: Fall 1999

Status	Institutional Type			
	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent of institutions 100% compliant	67%	64%	68%	69%
Percent compliant by:				
October 1	68%	66%	68%	69%
November 1	80%	81%	78%	81%
December 1	90%	93%	91%	88%
January 1	97%	96%	97%	93%

Excludes minority-serving and foreign institutions.

Table 16
Status of Y2K Compliance for **Central Administration Systems** in Minority-Serving Postsecondary Institutions: Fall 1999

Status	Minority-Serving Institution			
	Overall	HBCU	HSI	Tribal
Percent of institutions 100% compliant	60%	54%	66%	48%
Percent compliant by:				
October 1	61%	57%	66%	48%
November 1	70%	68%	72%	66%
December 1	88%	88%	89%	79%
January 1	96%	95%	96%	100%

Excludes foreign institutions.

Table 17
Status of Y2K Compliance for **Student Services Systems** in Postsecondary Institutions Overall and by Enrollment: Fall 1999

	Enrollment			
Status	Overall	<1,000	1,000-4,999	≥5,000
Percent of institutions 100% compliant	70%	72%	67%	67%
Percent compliant by:				
October 1	71%	73%	67%	68%
November 1	81%	83%	78%	79%
December 1	91%	91%	90%	89%
January 1	96%	96%	96%	97%

Excludes minority-serving and foreign institutions.

Table 18
Status of Y2K Compliance for **Student Services Systems** in Postsecondary Institutions: by Institutional Type, Fall 1999

	Institutional Type			
Status	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent of institutions 100% compliant	67%	68%	66%	75%
Percent compliant by:				
October 1	69%	70%	66%	75%
November 1	82%	80%	78%	86%
December 1	90%	91%	90%	91%
January 1	97%	96%	96%	96%

Excludes minority-serving and foreign institutions.

Table 19
Status of Y2K Compliance for **Student Services Systems** in Minority-Serving Postsecondary Institutions: Fall 1999

	Minority-Serving Institution			
Status	Overall	HBCU	HSI	Tribal
Percent of institutions 100% compliant	60%	58%	60%	72%
Percent compliant by:				
October 1	63%	60%	63%	76%
November 1	74%	73%	72%	86%
December 1	88%	86%	89%	93%
January 1	94%	92%	95%	100%

Excludes foreign institutions.

Table 20
Status of Y2K Compliance for **Infrastructure Systems** in Postsecondary Institutions Overall and by Enrollment: Fall 1999

	Enrollment			
Status	Overall	<1,000	1,000-4,999	≥5,000
Percent of institutions 100% compliant	62%	64%	61%	55%
Percent compliant by:				
October 1	63%	65%	61%	57%
November 1	72%	72%	71%	71%
December 1	79%	78%	80%	82%
January 1	85%	83%	88%	92%

Excludes minority-serving and foreign institutions.

Table 21
Status of Y2K Compliance for **Infrastructure Systems** in Postsecondary Institutions: by Institutional Type, Fall 1999

	Institutional Type			
Status	4-Year Public	4-Year Private	2-Year Public and Private	Proprietary
Percent of institutions 100% compliant	59%	59%	56%	71%
Percent compliant by:				
October 1	61%	61%	56%	71%
November 1	74%	70%	69%	75%
December 1	86%	80%	77%	80%
January 1	94%	86%	83%	84%

Excludes minority-serving and foreign institutions.

Table 22
Status of Y2K Compliance for **Infrastructure Systems** in Minority-Serving Postsecondary Institutions: Fall 1999

	Minority-Serving Institution			
Status	Overall	HBCU	HSI	Tribal
Percent of institutions 100% compliant	46%	40%	49%	59%
Percent compliant by:				
October 1	50%	45%	52%	59%
November 1	61%	60%	61%	69%
December 1	78%	77%	79%	79%
January 1	88%	86%	89%	86%

Excludes foreign institutions.

Appendix A

Survey Methodology

Westat conducted the *Survey of Y2K Readiness in the Nation's Postsecondary Institutions* in three phases:

- Sampling
- Interviewing and data processing, and
- Sampling weighting and nonresponse adjustment

Non-Minority Serving Postsecondary Institutions

Sampling

A single-stage stratified design was used to draw a sample of 1600 non-minority-serving postsecondary educational institutions from the Postsecondary Education Participant's System (PEPS) frame provided by ED. The frame contained 5,594 records for non-minority-serving institutions in the U.S., Puerto Rico, and the Virgin Islands. Foreign institutions were excluded from the sampling frame.

Enrollment data were merged onto the file using data from NCES's Integrated Postsecondary Education Systems (IPEDS). Institutions were stratified by size and type and were selected independently, with equal probability, from each stratum. Because the strata differed in size, the probability of selection differed by stratum. The sample was allocated among the strata so that 400 of each institution type were selected; 534, 533, and 533 of the three size groups were selected.

The institutions were classified by size based on enrollment:

Large	5,000 or larger;
Medium	1,000 to 4,999;
Small	less than 1,000.

The type classification was: 4-year public, 4-year private, 2-year public/private, and proprietary. These classes were crossed to produce twelve sampling strata:

Institution Size	Institution Type
large	4-yr public
large	4-yr private
large	2-yr public/private
large	proprietary
medium	4-yr public
medium	4-yr private
medium	2-yr public/private
medium	proprietary
small	4-yr public
small	4-yr private
small	2-yr public/private
small	proprietary

Within each size stratum, the frame was sorted by census region and enrollment. The states were grouped into five census regions: Northeast, North Central, South, West, and other jurisdictions. Institutions were then selected systematically with a random start from the sorted frame.

Interviewing and Data Processing

Once the sample was drawn, ED mailed letters to the presidents/chancellors of each institution informing them of the survey. Westat interviewers telephoned the institutions asking to speak to the person most knowledgeable about the institution's Y2K progress, such as a Y2K coordinator, MIS director, or technology coordinator. Interviewing was conducted from September 13 through October 11, 1999. Westat achieved an 84 percent response rate. The survey data were entered into Westat's COED data processing system and verified for keypunching accuracy.

Sampling Weights and Nonresponse Adjustment

After the sample was selected, a sampling weight was calculated; this is the reciprocal of the selection probability. Next, proportionally allocating the replicates among the strata, 160 replicate weights were constructed for estimating sampling variance by the generalized jackknife method. These weights were then adjusted for nonresponse. Because the proportion of the population sampled was large for most strata, finite population correction factors were calculated.

The sampled records were sorted in selection order within each stratum and then systematically assigned to the allocated replicates. Each replicate was then dropped in turn, and the weights of the remaining records in the stratum containing that replicate were adjusted by the factor $n_h/(n_h-1)$, where n_h is the number of replicates in stratum *h*.

Response status for each sampled institution was assigned as follows:

1 eligible respondent (complete interview);
2 eligible nonrespondent (refusal; maximum calls, interview not completed; maximum calls, no contact);
3 ineligible.

The full-sample and replicate weights were then adjusted for nonresponse. A factor of $(S_1+S_2)/S_1$ was used when recalculating respondents' weights, where S_1 is the sum of respondents' weights and S_2 is the sum of nonrespondents' weights. Nonrespondents' weights were then set to zero. Ineligibles were not included in the adjustment; their weights were also set to zero.

Finite population correction factors were calculated for each replicate as follows:

$$f_g = 1 - \frac{n_h}{N_h},$$

where n_h is the number of sampled institutions in stratum *h*, and

N_h is the population of institutions in stratum *h*.

Factors required for estimating variance using the generalized jackknife method were calculated for each replicate as follows:

$$h'_g = \frac{(n_{h'} - 1)}{n_{h'}},$$

where $n_{h'}$ is the number of replicates in stratum *h*' and stratum *h*' contains replicate *g*.

These factors were applied according to the following formula to calculate variance estimators using Version 4 of WesVar PC:

$$v(\hat{\Theta}) = \sum_{g=1}^{G} f_g h_g \left(\hat{\Theta}_{(g)} - \hat{\Theta} \right)^2 ,$$

where

Θ is the proportion of interest

$\hat{\Theta}$ is the full-sample estimate of the proportion

$\hat{\Theta}_{(g)}$ is the g^{th} replicate estimate of the proportion, based on the records in replicate g

G is the total number of replicates

$v(\hat{\Theta})$ is the estimated variance of the full-sample estimate of the proportion

The number of institutions in the sample and the unweighted and weighted number of institutions by strata are as follows:

Strata	Number of Institutions in Sample	Unweighted Number of Institutions in Sample (Completed Interviews)	Weighted Number of Institutions
Size			
Large	534	440	748
Medium	533	451	1,333
Small	533	441	3,113
Type			
4-year public	400	341	506
4-year private	400	324	1,347
2-year public/private	400	327	1,537
Proprietary	400	340	1,805
Total	1,600	1,332	5,194

Notes: Twelve institutions were ineligible to be surveyed due to closure or absence of technology.
The sum of the categories may not equal the total due to rounding.

Variances

The standard error is a measure of the variability of estimates due to sampling. It indicates the variability of a sample estimate that would be obtained from all possible samples of a given design and size. Standard errors are used as a measure of the precision expected from a particular sample. If all possible samples were surveyed under similar conditions, intervals of 1.96 standard errors below and 1.96 standard errors above a particular statistic would include the true confidence interval. For example, 61 percent of postsecondary institutions reported that their mission-critical systems were 100 percent Y2K compliant and the standard error is 0.7 percentage points. The 95 percent confidence interval for the statistic extends from [61 – (0.7 times 1.96)] to [61

– (0.7 times 1.96)], or 59.6 to 62.4 percent (+/- 1.4%). Standard errors and estimate ranges for selected statistics are provided in Appendix B.

Minority-Serving Institutions

Westat interviewed the universe of 342 minority-serving institutions using lists of such institutions provided by ED. The universe included 123 Historically Black Colleges and Universities, 188 Hispanic-serving institutions, and 31 Tribal institutions. Definitions used to classify minority-serving institutions are provided in Appendix D. Westat constructed the universe frame from lists provided by ED and from the PEPS data file using the variable ETHNICCODE variable to determine minority status.

The survey was conducted from September 8 through October 15, 1999, and closed with a 90 percent response rate for HBCUs, 88 percent for HSIs, and 94 percent for Tribal institutions. Three institutions were ineligible to be surveyed due to closure or absense of technology. Because this was a universe of the population, weighting was not required. However, the estimates were adjusted for non-response by setting the values for the missing cases to 0.

Appendix B

Supporting Tabulations for Selected Statistics

Postsecondary overall	Estimate	Standard Error	Range of Estimate (+/-)	Large (enrollment 5,000 or greater) Estimate	Standard Error	Range of Estimate (+/-)
Q1. All Mission Critical Systems 100% Y2K Compliant (Total)	61%	0.7	1.4	57%	2.0	3.9
Q2. Hardware, Software, etc. Testing To Assure Y2K Readiness (Total)	85%	0.6	1.2	84%	1.2	2.3
Q3. Y2K Testing with Major Trading Partners (Total)	44%	0.8	1.6	47%	1.8	3.5
Q4. Development of Y2K Business Continuity Contingency Plans (Total)	73%	0.7	1.4	68%	1.6	3.2
Q5A. Y2K Compliance for Central Administration (e.g., acct/finance) (Total)	67%	0.6	1.3	66%	1.9	3.8
Q5B. Y2K Compliance for Student Services (e.g., student records) (Total)	70%	0.7	1.4	67%	1.9	3.8
Q5C. Y2K Compliance for Infrastructure (e.g., building/security) (Total)	62%	0.8	1.6	55%	1.7	3.4

Note: Three institutions were ineligible to be surveyed because of closure or absence of technology.

Medium (enrollment 1,000-4,999)	Estimate	Standard Error	Range of Estimate (+/-)	Small (enrollment < 1,000) Estimate	Standard Error	Range of Estimate (+/-)
Q1. All Mission Critical Systems 100% Y2K Compliant (Total)	54%	1.6	3.1	65%	0.9	1.7
Q2. Hardware, Software, etc. Testing To Assure Y2K Readiness (Total)	86%	0.8	1.6	84%	0.9	1.7
Q3. Y2K Testing with Major Trading Partners (Total)	40%	1.6	3.2	46%	1.1	2.2
Q4. Development of Y2K Business Continuity Contingency Plans (Total)	70%	1.4	2.7	75%	0.9	1.8
Q5A. Y2K Compliance for Central Administration (e.g., acct/finance) (Total)	65%	1.4	2.8	68%	0.8	1.5
Q5B. Y2K Compliance for Student Services (e.g., student records) (Total)	67%	1.2	2.4	72%	1.0	1.9
Q5C. Y2K Compliance for Infrastructure (e.g., building/security) (Total)	61%	1.4	2.7	64%	1.1	2.2

4-year public				4-year private		
	Estimate	Standard Error	Range of Estimate (+/-)	Estimate	Standard Error	Range of Estimate (+/-)
Q1. All Mission Critical Systems 100% Y2K Compliant (Total)	61%	2.58	5.06	58%	1.30	2.55
Q2. Hardware, Software, etc. Testing To Assure Y2K Readiness (Total)	86%	1.53	3.00	85%	1.21	2.38
Q3. Y2K Testing with Major Trading Partners (Total)	54%	2.26	4.43	38%	1.42	2.79
Q4. Development of Y2K Business Continuity Contingency Plans (Total)	74%	2.11	4.13	67%	1.29	2.54
Q5A. Y2K Compliance for Central Administration (e.g., acct/finance) (Total)	67%	2.46	4.81	64%	1.34	2.63
Q5B. Y2K Compliance for Student Services (e.g., student records) (Total)	67%	2.49	4.88	68%	1.28	2.50
Q5C. Y2K Compliance for Infrastructure (e.g., building/security) (Total)	59%	1.51	2.96	59%	1.31	2.56

2-year public and private				Proprietary		
	Estimate	Standard Error	Range of Estimate (+/-)	Estimate	Standard Error	Range of Estimate (+/-)
Q1. All Mission Critical Systems 100% Y2K Compliant (Total)	58%	1.30	2.55	67%	1.295	2.54
Q2. Hardware, Software, etc. Testing To Assure Y2K Readiness (Total)	82%	1.16	2.27	87%	0.965	1.89
Q3. Y2K Testing with Major Trading Partners (Total)	42%	1.42	2.78	49%	1.669	3.27
Q4. Development of Y2K Business Continuity Contingency Plans (Total)	70%	1.54	3.01	80%	0.99	1.94
Q5A. Y2K Compliance for Central Administration (e.g., acct/finance) (Total)	68%	1.01	1.97	69%	1.125	2.21
Q5B. Y2K Compliance for Student Services (e.g., student records) (Total)	66%	1.56	3.06	75%	1.013	1.99
Q5C. Y2K Compliance for Infrastructure (e.g., building/security) (Total)	56%	1.78	3.49	71%	1.33	2.61

Minority-Serving Institutions Overall			Tribal		HBCUs		HSI	
	Number		Number		Number		Number	
	Nonadjusted	Adjusted	Nonadjusted	Adjusted	Nonadjusted	Adjusted	Nonadjusted	Adjusted
Total	306	339	29	29	111	122	166	188
Q1. All Mission Critical Systems 100% Y2K Compliant (Total)	136	151	15	15	43	47	78	88
Q2. Hardware, Software, etc. Testing To Assure Y2K Readiness (Total)	256	284	26	26	85	93	145	164
Q3. Y2K Testing with Major Trading Partners (Total)	129	143	11	11	44	48	74	84
Q4. Development of Y2K Business Continuity Contingency Plans (Total)	209	232	20	20	66	73	123	139
Q5A. Y2K Compliance for Central Administration (e.g., acct/finance) (Total)	183	203	14	14	60	66	109	123
Q5B. Y2K Compliance for Student Services (e.g., student records) (Total)	184	203	21	21	64	70	99	112
Q5C. Y2K Compliance for Infrastructure (e.g., building/security) (Total)	142	157	17	17	44	48	81	92

Appendix C

Survey Instructions and Instrument

Survey Instructions

Please review the instructions and the survey form. Westat, ED's contractor, will call for your survey answers.

ABOUT THIS SURVEY: The U.S. Department of Education (ED) is conducting this telephone follow-up survey to determine the Year 2000 (Y2K) readiness of postsecondary institutions. Your institution was selected at random for this survey. Information obtained from this survey will help the postsecondary education community prepare for the new millennium. Please designate the most senior representative who is knowledgeable about your institution's Y2K work to complete the survey.

CONFIDENTIALITY STATEMENT: All reports on the data collected from this survey will be in aggregate form to protect your confidentiality. Individual institutions will never be identified. Your response to the survey will NOT affect your institution's eligibility for student loans, grants, or funding. Federal legislation protects you from liability claims related to good-faith information sharing about the year 2000 problem.

SURVEY DETAILS: Be prepared to answer all of the questions when an interviewer from Westat telephones you in the next few weeks, between now and October 15th. Results of this survey will be posted on the Department's website by November 1, 1999.

QUESTIONS ABOUT THE SURVEY? If you have questions regarding the survey, please call Westat at **1-888-925-5829.** Your questions will be answered within two business days.

Name of your institution _____

Please check the box of the most appropriate answer.

1. When do you estimate that all of your institution's mission-critical systems will be 100% Y2K compliant?

   All of my institution's mission-critical systems are 100% year 2000 compliant. ☐ **Yes** ☐ **No**
   OR
   If not now, when? MN/YR: **_____/_____**

2. Has your institution taken action to assure all of its hardware, software, and embedded technologies are Y2K renovated, tested, and implemented? ☐ **Yes** ☐ **No**

   If not, when? MN/YR: _____/_____

3. Has your institution conducted Y2K testing with all of its major trading partners including the U. S. Department of Education? ☐ **Yes** ☐ **No**

4. Have Y2K business continuity contingency plans been developed for *all* of your institution's mission-critical business and related systems? ☐ **Yes** ☐ **No**

   If not, when? MN/YR: _____/_____

5. Please estimate the percent completed on Y2K compliance work for each of the following:

   Central Administration (e.g., accounting, finance, payroll, personnel) ___% completed
   If not 100%, when will it be completed? MN/YR: ____/_____

   Student Services (e.g., student records, food services, transportation) ___% completed
   If not 100%, when will it be completed? MN/YR: ____/_____

   Infrastructure(e.g., buildings/security, heating/AC, telecommunications) ____% completed
   If not 100%, when will it be completed? MN/YR: _____/_____

Appendix D

Glossary

Data Exchanges—The act of giving or taking any type of information in return for information. For example data exchanges would include any data received from or sent to internal or external sources for academic administrative purposes. Data exchanges can be internal or external to an organization. Bridges, filters and/or interfaces may be involved in the electronic exchange of data.

Institution Size—The institutions were stratified by size based on enrollment:

Large	greater than 10,000;
Medium	2,500 to 9,999;
Small	less than 2,500.

Embedded Technologies—Devices (such as microprocessors and microcontrollers) used to control, monitor, or assist the operation of equipment, machinery, or plant. 'Embedded' reflects the fact that they are an integral phase of the system. Examples of embedded technologies include: chilled and hot water systems, fax machine, kitchen equipment, photocopiers, postage franking machines, pre-printed forms (19__), and telephone system. For more information on examples of embedded technology please refer to the following web site: http://www.nd.edu/~y2k/examples/embedded.html

Hardware—The physical, touchable, material parts of a computer or other system. The term is used to distinguish these fixed parts of a system from the more changeable software or data components which execute, store, or carrry. Computer hardware typically consists chiefly of electronic devices (CPU, memory display) with some electromechancial parts (keyboard, printer, disk drives, tape drives, loudspeakers) for input, output, and storage.

Minority-Serving Institutions—U.S. institutions were identified as Historically Black Colleges and Universities (HBCU), Hispanic-Serving Institutions (HSI), and Tribal Colleges and Universities (TCU) by the Department. (It is important to note that an institution may be in more than one of the minority-serving institution categories.) The following defines these three types of institutions:

- **Historically Black Colleges and Universities**—Postsecondary academic institutions founded before 1964 whose educational mission has historically been the education of Black Americans. HBCUs enroll less than 20 percent of African-American undergraduates but award one-third of all bachelor's degrees and a significant number of the advanced degrees earned by African-Americans.

- **Hispanic-Serving Institutions**—Institutions of higher education that, at the time of application, have enrollments of undergraduate full-time equivalent students that are at least 25 percent Hispanic students and that (1) admit as regular students only persons having a certificate of graduation from a institution providing secondary education or the recognized equivalent of such a certificate; (2) are public or other nonprofit institutions accredited by a nationally recognized accrediting body; and (3) are legally authorized to

provide a program of education beyond the secondary level for which a 2-year associate, baccalaureate, or higher degree is awarded.

- **Tribal Colleges and Universities**—Institutions cited in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (7 U.S.C. 301 note), any other institution that qualifies for funding under the Tribally Controlled Community College Assistance Act of 1978, (25 U.S.C. 1801 et seq.), and Navajo Community College, authorized in the Navajo Community College Assistance Act of 1978, Public Law 95-471, title II (25 U.S.C. 640a note). These colleges are, with few exceptions, tribally controlled and located on reservations. They are all members of the American Indian Higher Education Consortium.

For this survey, the HBCU category includes historically black colleges and universities as identified from the HBCU address list (updated June 28, 1999) from the White House Initiative on HBCUs.

For this survey, the minority-serving institution category of HSIs includes Title V Hispanic-serving institutions from 1997 to 1998, as identified from draft data compiled by the White House Initiative on Educational Excellence for Hispanic Americans (July 6, 1999). A Title V Hispanic-serving institution is defined as any accredited and degree-granting institution of higher education with 25 percent or greater total Hispanic undergraduate full-time equivalent enrollment.

For this survey, the TCU category includes Tribal colleges and universities as identified from the TCU address list (updated May 19, 1999) from the White House Initiative on TCUs.

Mission-Critical System—An information system that is essential to a core business activity or process.

Software—Something used or associated with and usually contrasted with hardware: as the entire set of programs, procedures, and related documentation associated with a system and especially a computer system.

Trading Partner—One that is united or associated with another or others in a business activity of buying and selling commodities or a sphere of common business interest. Trading partners (such as, suppliers, vendors, and business partners) that may need Y2K attention include those who provide essential materials such as fuel; food; and lab, medical, and office equipment; or who maintain and repair critical equipment. Others may include partners who handle institutional funds (banks, investment firms, accountants), work with institution data (information systems contractors, data management vendors, testing services), or team with the institution in teaching. Do not forget organizations that provide grants and significant kinds of operating revenue including government agencies and philanthropic groups.

Written Plan—To set down in writing (draw-up or draft on paper) a program of action.

Year 2000 Compliance—In regard to the Y2K problem, the act or process of correct identification, manipulation, and calculation, including leap years, outside of the 1900-1999 year range. The hardware and software or embedded technology must pass a series of Y2K tests demonstrating the aforementioned capabilities.

Year 2000 Contingency Plan—The formulation and documentation of a program of action that describes in detail the alternative work procedure in the uncertain event of a Y2K-related failure. The plan identifies steps the organization would take in order to respond to the loss of a system/function/process and to ensure the continuity of business operations in the event of a Y2K-induced failure.

Year 2000 Problem—The potential obstacle and its variations that might be encountered in any level of computer hardware and software from microcode to application programs, files, and databases that need to correctly interpret year-date data represented in 2-digit-year format.

The Y2K problem resulted from a common programming practice, begun in the 1960s, to represent dates with six digits instead of eight (010198 vs. 01011998). This shorthand saved disk space and thus money. Unfortunately, because the first two digits of the year are omitted, programs assume that each date entry is dated in the 20th century. No one imagined that the software programs created then would still be in use in 2000. The problem is exacerbated by the fact that dates are located everywhere in programs, and no one can forecast how an application will respond to dates from other centuries without evaluation and analysis.